Take Control of Your IPv6 Transition

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Rethink Possible
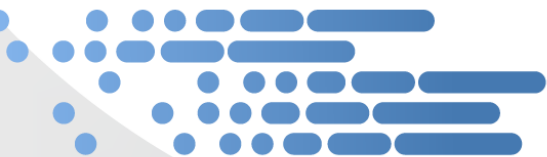
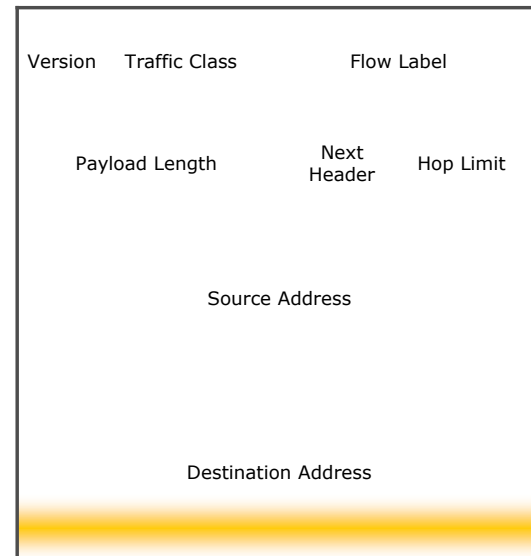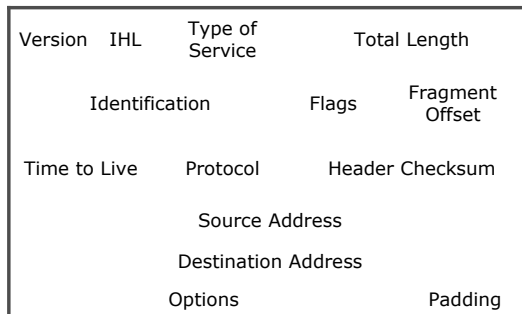# What is IPv6?

Fundamentally:
a new packet header with a larger address space

Strategically:
an enabler of new network-based capabilities that previously had been difficult or impossible with IPv4

IPv6 provides:

- The larger address space

- The new fields

- Standard packet header options

Version	IHL	Type of Service	Total Length	
	Identification		Flags	Fragment Offset
Time to Live		Protocol	Header Checksum	
		Source Address		
		Destination Address		
		Options		Padding

Version	Traffic Class		Flow Label	
	Payload Length		Next Header	Hop Limit
		Source Address		
		Destination Address		

An intended ripple effect of more addresses is:
less dependency on NAT, thus allowing more end-to-end applications

What Happens If I Am Not IPv6 Ready?

The Problem: IPv4 addresses will not be able to communicate with IPv6 addresses without some help

- Customers may not be able to reach your website
    - IP-enabled mobile devices may not locate IPv4 websites
    - IPv4/IPv6 eCommerce sites may not be able to receive orders from IPv6/IPv4 users
- Global communication/expansion will become challenging
    - Many Asian and European countries are migrating to IPv6
- Customized marketing will become more difficult
- Enterprises may experience increased SPAM activity
- Unified communications capabilities will be impacted
- Application capabilities may be limited: Machine to Machine

Be In Control of Your Own Destiny:
Start Planning for Ipv6 Today

Customer Drivers for IPv6

1. Mobility applications

2. Remote access

3. Remote site connectivity
(Branch offices, SoHo)

4. Extranet connectivity

5. Cloud Computing

Integrating Mobile Applications

- Mobile devices/smart devices are key drivers in moving to IPv6

  - RFID tags: Each tag has an IP address

  - Asset tracking: Mixing GPS tracking with wireless connectivity produces millions of unique endpoints requiring IP addresses

  - Smart-Grid: Smart meters need to be uniquely addressable, producing millions of IP addresses

  - Shift to VoIP wireless endpoints: Phones require permanent and constant IP uniqueness

- Wireless application integration can be complex and potentially expand the requirements for IPv6 from the network, middleware platforms and back-office systems

Supporting Remote Access via Internet

The Internet is the key application for IPv6 transitions

There are two main considerations:

1. Enable external users (wide variety)

- Begin planning to dual-stack your public-facing Internet Services
- Include all Web and email servers and the supporting network, security and operations capabilities
- Security controls, equipment, processes and policies are prevalent in the External facing internet services. All must support IPv6 capabilities

2. Enable internal users (employees/guests)

- Develop strategy regarding dual stack vs. tunneling architecture
- Tunneling allows for IPv6 hosts to connect to the Internet over IPv4 LAN's and WAN's
- Priority sequencing of transition should be Internet, Hosts, WAN/LAN, Servers

IPv6 Requirements for Remote Locations

- Remote locations interconnect via the WAN, the Internet and sometimes wirelessly

- Many locations use the WAN as the primary communication method and the Internet as backup

  - If any system, application or user at a remote site requires Internet access or services, the site must support IPv6 on the LAN and WAN

  - The site can be enabled with dual stack capabilities or utilize tunneling mechanisms

  - Determining where to dual stack and where to tunnel are dependent upon network readiness for IPv6

  - Decisions around upgrade, refresh or replacement of network equipment to support dual stack are necessary

Preparing Extranets

- Business partners historically use "Extranet" solutions to interface with customer applications

    – Extranet access via the Internet is common, but private networks do exist.

    – Identify partners or suppliers in US Government, Asia or Europe

    – Understand the direction and requirements of your business partners - Will they transition first? How will that impact you?

    – Develop an IPv6 architecture and strategy for the aspects of the environment that provides Extranet connectivity

The Impact of IPv6 on Cloud Computing

Cloud computing utilizes 3 major approaches:
Private Cloud, Public Cloud and a Hybrid of both

1. Private Cloud
- Utilizes non-Internet based delivery
- Impact of IPv6 can be minimal

2. Public Cloud
- Utilizes Internet-based infrastructure,
- Impact of IPv6 can be significant

3. Hybrid
- Depending on utilization of Internet, IPv6 impact can be significant

- If you are considering moving home grown applications to an Internet-based cloud, application rewrites may be required

- Common off the Shelf Applications will require IPv6 compliance validation and testing prior to be candidates for public cloud

IPv6 Transition Guidelines

- **Enable IPv6 in the Internet**
  Enable your public-facing Web and email servers with an IPv6 address in addition to IPv4 addresses. This makes more resources available via IPv6 for everyone

- **Extend IPv6 to Reach External Users**
  Implement dual-stack IP addressing on all public-facing Web servers and other equipment. Ensure you account for "Extranet users"

- **Implement Dual Stack on Your Internal WAN**
  Tunnel where not feasible

- **Consider Impact on Other Initiatives**
  Whether it is in emerging services such as Cloud or mobility or expansion of current services, IPv6 connectivity should be integral to future planning
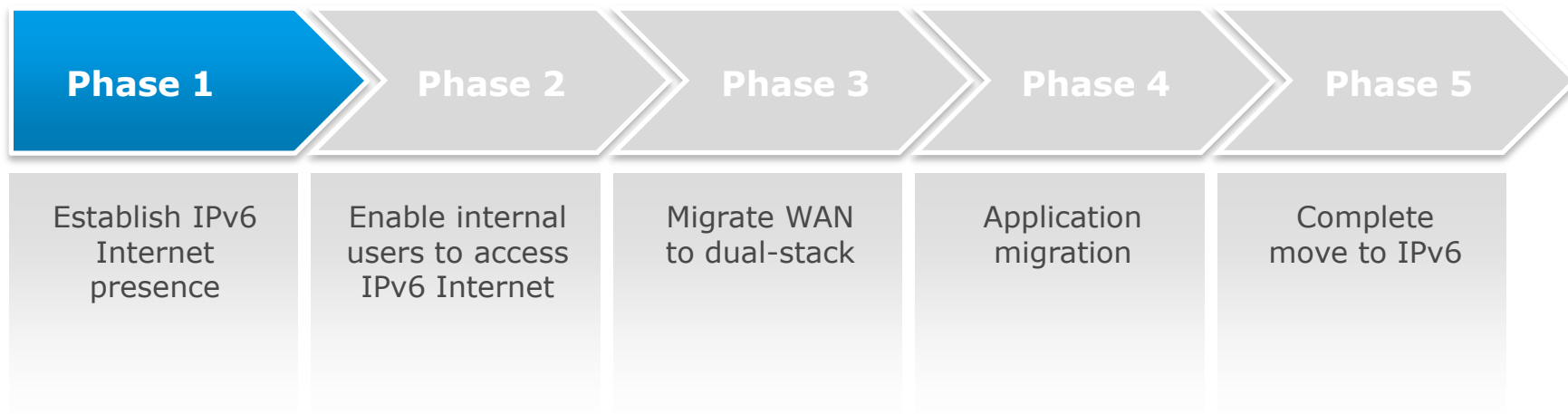
- **Get Started Now**
  While painstaking, IPv6 is necessary and will require change across the IT footprint. Large Scale NAT should be transitional, temporary, if used at all

Sample IPv6 Network Migration
Phase 1

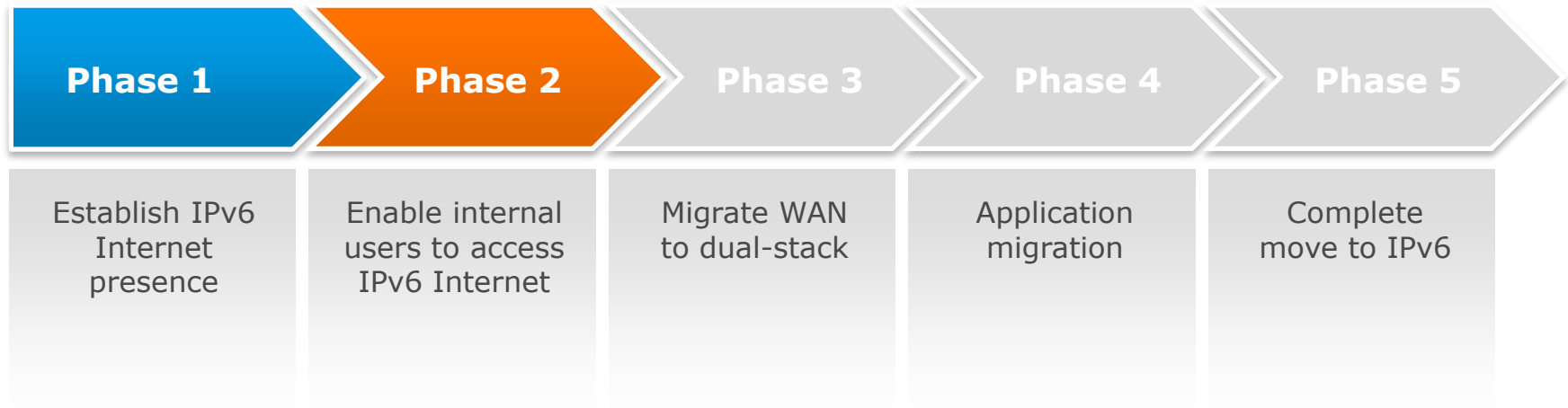| Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Establish IPv6 Internet presence	Enable internal users to access IPv6 Internet	Migrate WAN to dual-stack	Application migration	Complete move to IPv6

When: 2010-2011

Why: Want IPv6 Internet presence, Potential reach to Partners/suppliers if needed

Impact: DMZ addressing, Web Servers, Load Balancers, Firewalls, Internet Facing Router
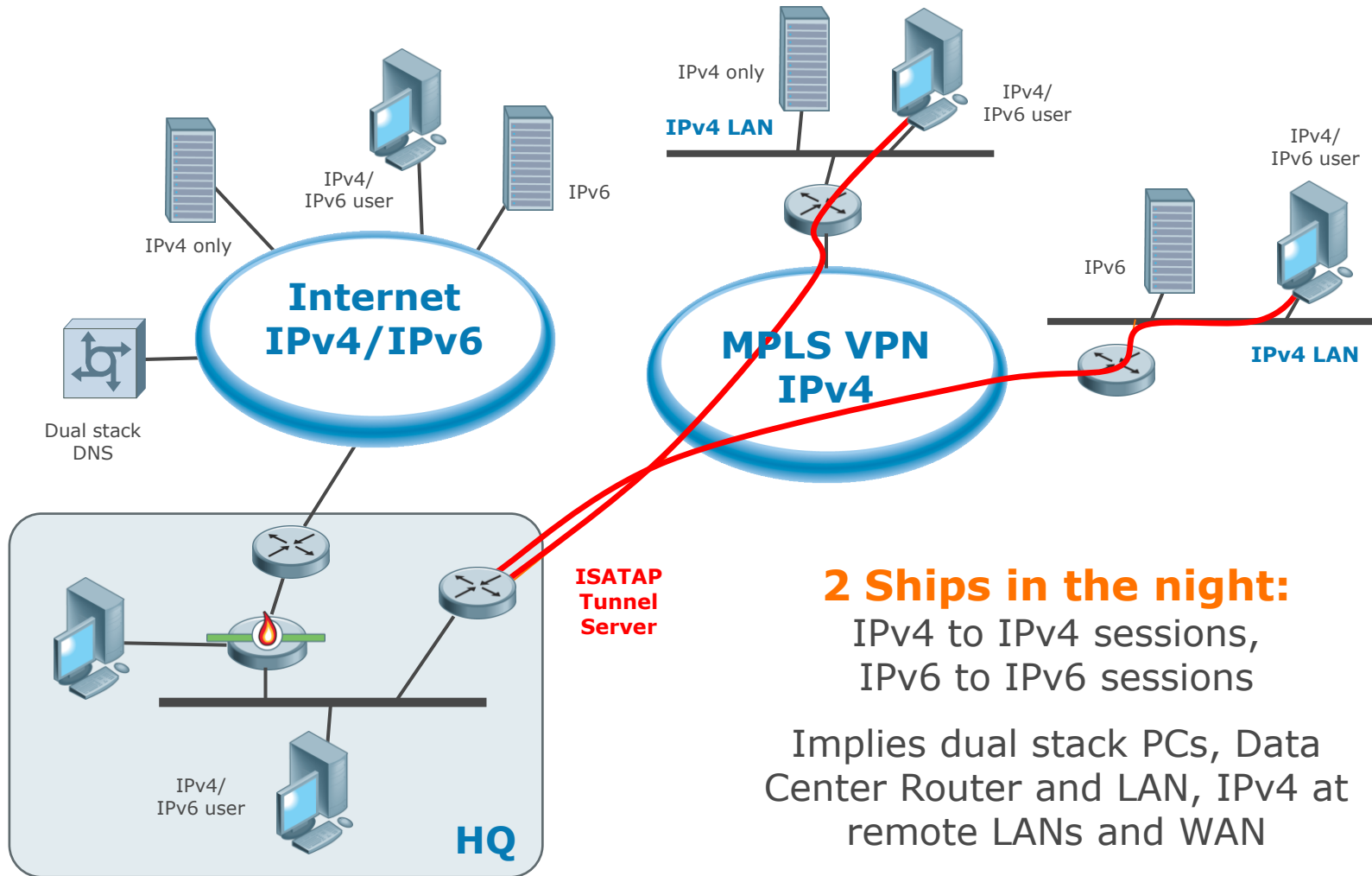
Sample IPv6 Network Migration
Phase 2

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Establish IPv6 Internet presence	Enable internal users to access IPv6 Internet	Migrate WAN to dual-stack	Application migration	Complete move to IPv6

When: 2010-2012

Why: Want to reach IPv6 Internet content

Impact: Proxy, Tunneling (ISATAP)

Phase 2: IPv4 WAN with Dual Stack Internet
(ISATAP)
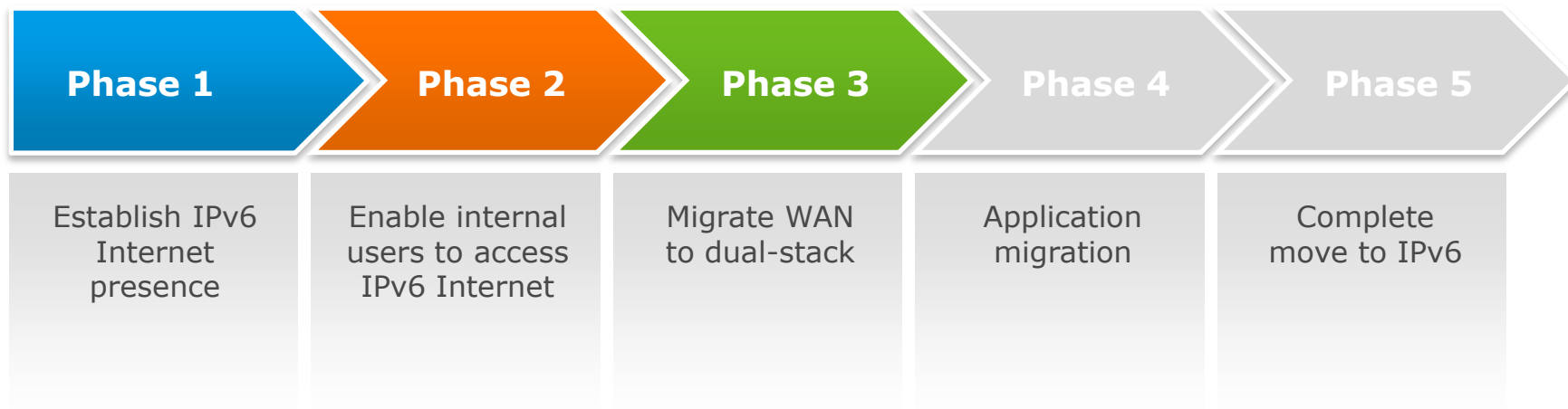

2 Ships in the night:
IPv4 to IPv4 sessions, IPv6 to IPv6 sessions

Implies dual stack PCs, Data Center Router and LAN, IPv4 at remote LANs and WAN

Sample IPv6 Network Migration
Phase 3

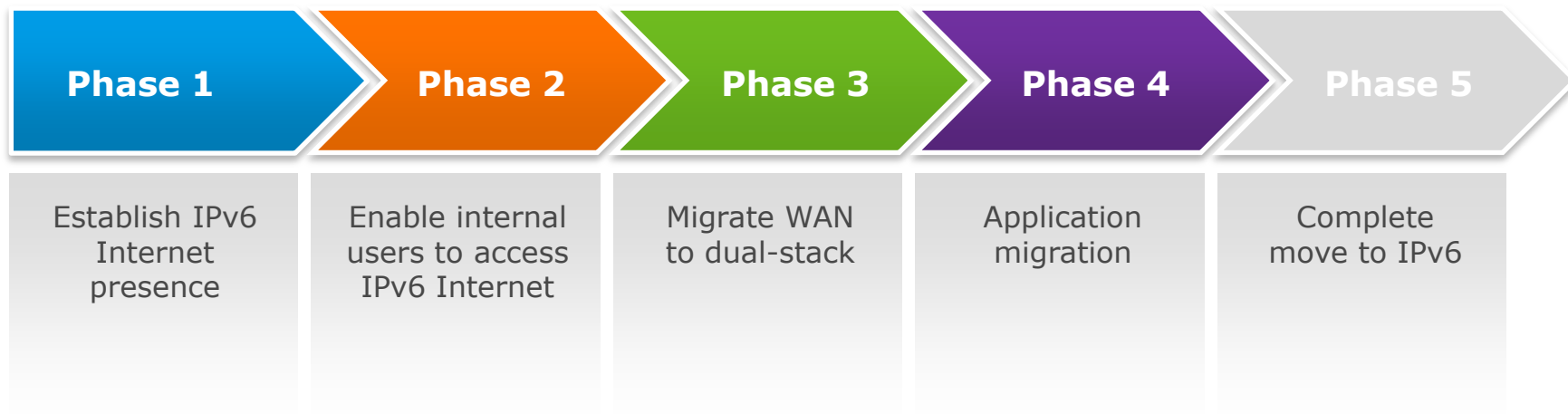| Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Establish IPv6 Internet presence	Enable internal users to access IPv6 Internet	Migrate WAN to dual-stack	Application migration	Complete move to IPv6

When: 2010-2014

Why: IPv6 support at remote locations. Integration of UC, mobility, push apps, etc

Impact: WAN addressing plan, DHCPv6 vs. Autoconfig, DNS, LDAP, remote LANs, routers to dual stack, WAN carrier support

Sample IPv6 Network Migration
Phase 4

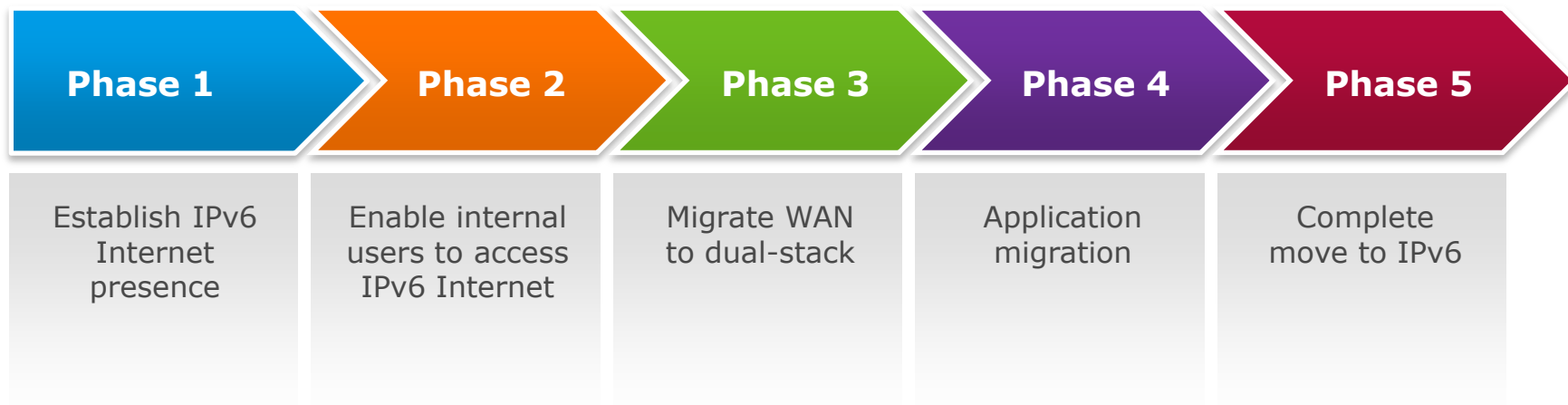| Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Establish IPv6 Internet presence	Enable internal users to access IPv6 Internet	Migrate WAN to dual-stack	Application migration	Complete move to IPv6

When: 2012-2020?

Why: Must migrate applications before you can turn down IPv4

Impact: 32 bit IPv4 fields in applications, screen (e.g.; reporting tools), etc, must move to support 128 bit IPv6 address

Sample IPv6 Network Migration
Phase 5

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Establish IPv6 Internet presence	Enable internal users to access IPv6 Internet	Migrate WAN to dual-stack	Application migration	Complete move to IPv6

When: 2015-2020?

Why: Move to IPv6 ONLY

Impact: May need v6 to v4 NAT or proxy to get to remaining IPv4 sites. Likely provided "in the network"
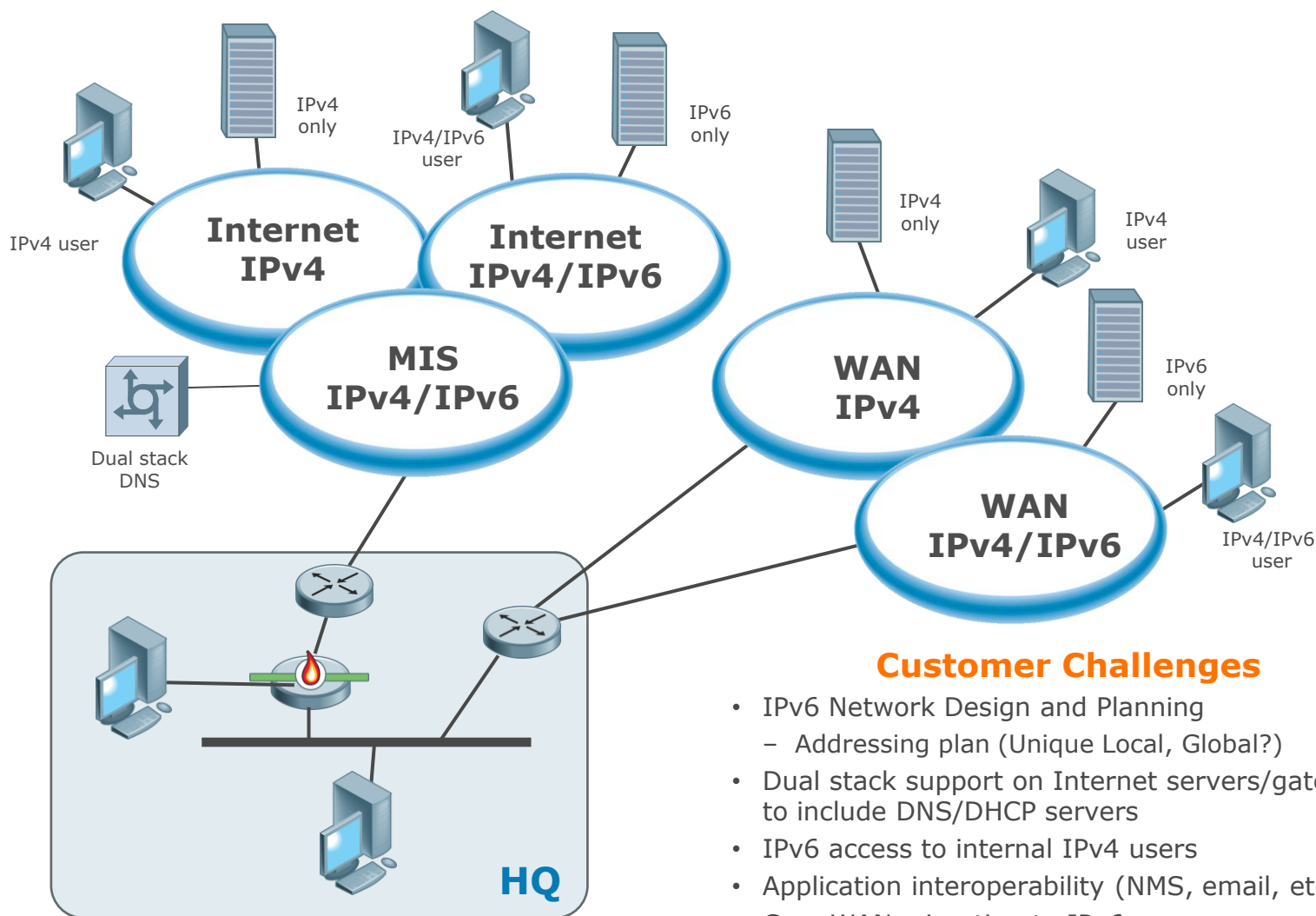
Establishing IPv6 Internet Presence is a Priority

Some of the pieces and parts of this IPv6 Phase 1 are:

- Internet connectivity
  - Dual Stack (IPv4/IPv6)
- Router
- Firewall
  - Inside
  - Outside
  - DMZ
- Servers
  - Web
  - DNS
  - Email
- Proxy Servers
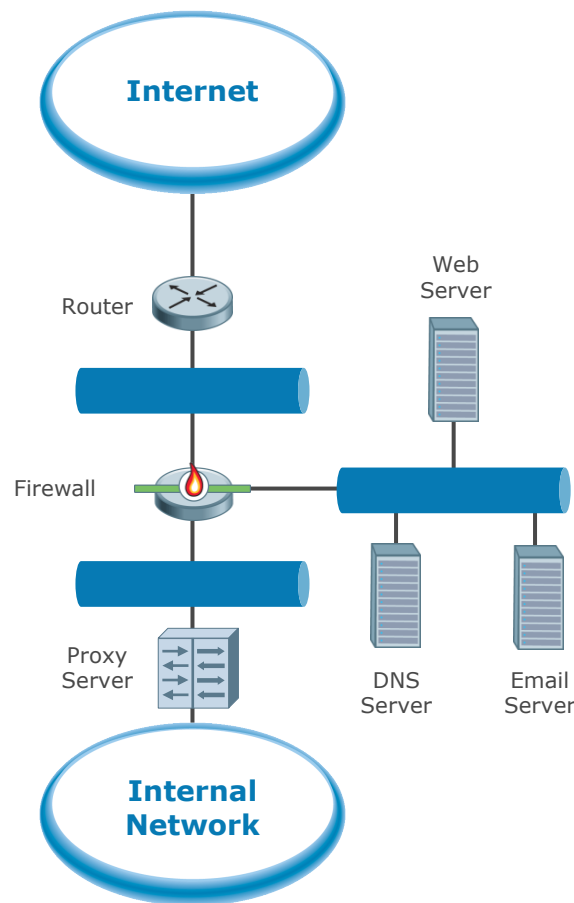
IPv6 Migration: 3 – 5 years (feasible?)

IPv4 only

IPv4/IPv6 user

IPv6 only

IPv4 only

IPv4 user

IPv4 user

IPv6 only

Internet IPv4

Internet IPv4/IPv6

MIS IPv4/IPv6

WAN IPv4

WAN IPv4/IPv6

Dual stack DNS

IPv4/IPv6 user

HQ

Customer Challenges

- IPv6 Network Design and Planning
  - Addressing plan (Unique Local, Global?)
- Dual stack support on Internet servers/gateways to include DNS/DHCP servers
- IPv6 access to internal IPv4 users
- Application interoperability (NMS, email, etc)
- Core WAN migration to IPv6

Planning Process for IPv6

Program Governance and Communication

- Create IPv6 transition timelines, sequencing and interdependencies
- Identify governance team to oversee plan
- Develop review and program management aspects of overall plan, timelines and assigned transition teams
- Execute plan

Infrastructure Readiness

- Quantify infrastructure readiness and understand transition impacts
- Categorize Components for Readiness

Strategy and Architecture

- Research IPv6 technologies utilized for transition (tunnels, translation mechanisms)
- Develop IP Addressing Plan
- Develop a thorough transition strategy

Design and Engineering

- Develop detailed design and equipment configurations, including:
  - IP addressing
  - DNS
- Identify and assign transition sequencing and engineering tasks
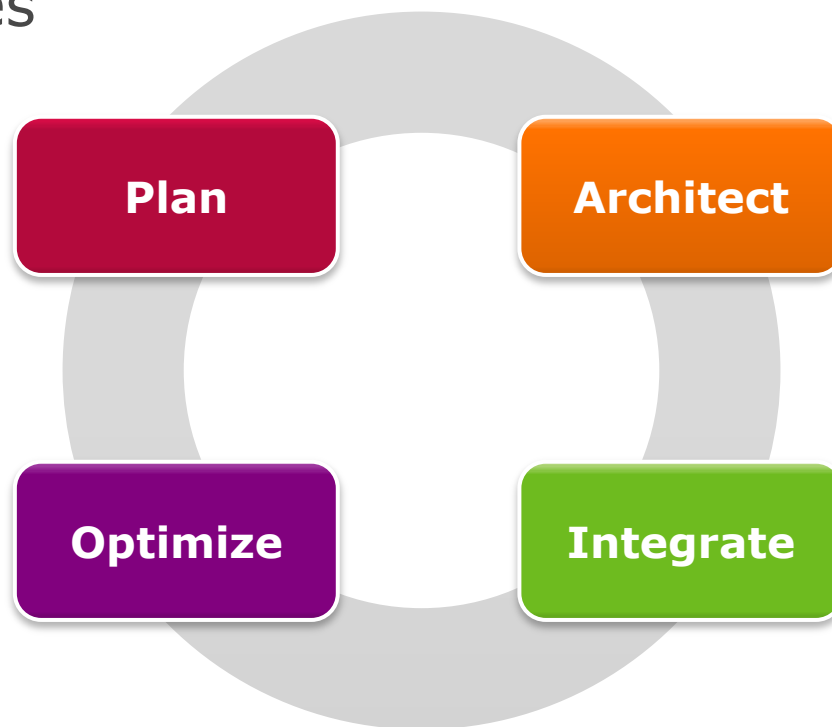
Testing and Piloting

- Create IPv6 test labs
- Develop test plans and production piloting
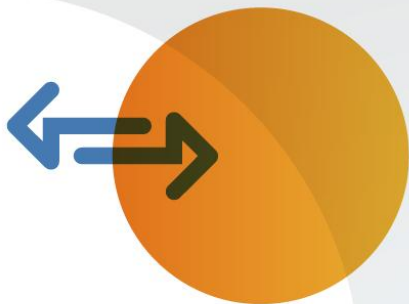- Conduct dual stack testing
- Tunneling

AT&T Can Help You With Any Phase of Your Ipv6 Planning Process

AT&T Consulting Can Help....

- IPv6 Strategy and Roadmap Services

- IPv6 Architect & Design Services

- IPv6 Implementation Services

Plan

Architect

Optimize

Integrate

Questions & Discussion

Resources

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http://www.business.att.com/enterprise/exchange_resourc e/Topic/technology-trends/Speeches/june_2010_ipv6/

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Take Control of Your IPv6 Transition

http://ideaexchange.business.att.com/t5/Take-Control-of-your-IPv6/bd-p/IPv6-Getting-Ready

**Our presenters will be
available to answer additional questions.**